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ADVISORY COMMITTEE ON SCIENCE AND
TECHNOLOGY FOR DEVELOPMENT
Eleventh session
14-18 January 1991
Item 2 of the provisional agenda

ADOPTION OF THE AGENDA AND OTHER ORGANIZATIONAL MATTERS

Provisional agenda

1. Election of officers.

2. Adoption of the agenda and other organizational matters.

3. Core programme:

   (a) Sustainable development/Environmentally sound technology assessment: input for the substantive theme of the Intergovernmental Committee on Science and Technology for Development;

   (b) Endogenous capacity-building through international co-operation;

   (c) Report of the Panel of Experts on Technology Missions;

   (d) Financing science and technology for development.

4. Additional inputs for the Intergovernmental Committee on Science and Technology for Development:

   (a) Selection of substantive themes for the Intergovernmental Committee;

   (b) Planning and management of science and technology policy.

5. Other matters:

   (a) Activities of the Centre for Science and Technology for Development and other organizations and bodies of the United Nations system;

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(b) Future programme of work.

6. Adoption of the report of the Advisory Committee on its eleventh session.

Annotations

1. Election of officers

The Advisory Committee will elect a Chairman and four Vice-Chairmen on the basis of equitable geographical distribution, and a Rapporteur, who will serve as an ex officio member of the Bureau. The Committee may wish to take into account the results of the consultations that have taken place in that regard.

2. Adoption of the agenda and other organizational matters

The provisional agenda for the eleventh session of the Advisory Committee was drawn up in consultation with Bureau members and on the basis of decisions made by the Advisory Committee at its tenth session.

3. Core programme

(a) Sustainable development/Environmentally sound technology assessment: input for the substantive theme of the Intergovernmental Committee on Science and Technology for Development

In accordance with General Assembly resolution 44/14, the substantive themes considered by the Intergovernmental Committee on Science and Technology for Development will be taken from items in the agenda of the General Assembly. Substantive themes will be analysed through the methodologies of technology assessment. Each such analysis will lead to an issue of the ATAS Bulletin.

The Intergovernmental Committee chose the following substantive theme for its eleventh session: ways and means of ensuring the participation of developing countries in international co-operation for research on and development of environmentally sound technologies, and the rapid and effective transfer of such technologies to those countries.

The Advisory Committee has considered this theme in conjunction with its ongoing work on science and technology for sustainable development. In the context of the discussion on the future work programme at its tenth session, the Advisory Committee accorded priority to that topic.

In addition to the report of the Task Force on Sustainable Development/ Environmentally Sound Technology Assessment (ESTA), the Advisory Committee will have before it the draft report on ESTA prepared by the Centre for submission to the Intergovernmental Committee. The Advisory Committee may wish to make substantive comments on that report.

Documentation

Report of the Task Force on Sustainable Development/Environmentally Sound Technology Assessment (ESTA) (ACSTD/XI/1)

Draft report on environmentally sound technology assessment (future ATAS Bulletin) (ACSTD/XI/2)

Report on ways and means of ensuring the participation of developing countries in international co-operation for research on and development of environmentally sound tec' logies, and the rapid and effective transfer of such technologies to those countries (ACSTD/XI/3)

(b) Endogenous capacity building through international co-operation

At the tenth session, the Task Force on National Strategies for International Co-operation and the Task Force on the Impact of International Co-operation on Endogenous Capacity-Building were merged. The Advisory Committee will have before it an integrated report following the outline agreed by the Task Force. The report also covers activities undertaken by the Centre on Science and Technology for Development and the United Nations Fund for Science and Technology for Development concerning pilot studies on endogenous capacity-building-stakeholders dialogues. The Advisory Committee may also wish to consider the integration of technology missions into the work of the Task Force.

In its work on this topic, the Committee has also focused on the possibility of developing a statement on the impact of international co-operation on building endogenous capacity. Efforts have been made to learn from the World Bank and the United Nations Development Programme, which have undertaken environmental impact assessments. The results of those efforts may be considered with a view to developing inputs to the major report on the subject for the Intergovernmental Committee.

Documentation

Report of the Task Force on Endogenous Capacity-Building through International Co-operation (ACSTD/XI/4)

(c) Report of the Panel of Experts on Technology Missions

The Advisory Committee convened the Panel of Experts on Technology Missions in Serock, Poland from 11 to 14 September 1990. The Panel reviewed case studies of Brazil, China, India, Italy, Jamaica, the Republic of Korea and West Africa and formulated guidelines for conceiving and executing technology missions. The Advisory Committee may wish to examine the report of the Panel and decide on the ways in which the results of the Panel can be incorporated into the work on endogenous capacity-building through international co-operation and any further actions.

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Documentation

Report of the Panel of Experts on Technology Missions (A/CN.11/AC.1/XI/2)

(d) Financing science and technology for development

At its tenth session the Intergovernmental Committee decided to include in the agenda of its eleventh session an item entitled "Financing science and technology for development". The Centre was requested to prepare a comprehensive report on the subject. The Advisory Committee is invited to provide its views on the draft report, addressing both general issues related to financing and the concept of the coalition of resources as a financial mechanism directly related to the implementation of the portfolio of priority initiatives emanating from the stakeholders dialogue process.

The Committee may also wish to be informed of the exchange of views between the Centre, the Swedish Agency for Research Co-operation with Developing Countries (SAREC) and a Bureau member in preparation for a meeting of multilateral and bilateral donors and recipients, to be held in June 1991, on the coalition of resources to implement the portfolio of priority initiatives on endogenous capacity-building.

Documentation

Concept paper on financing science and technology for development (ACSTD/XI/5)

Draft report of the Secretary-General on financing science and technology for development (ACSTD/XI/6)

4. Additional inputs for the Intergovernmental Committee on Science and Technology for Development

(a) Selection of substantive themes for the Intergovernmental Committee

On the recommendation of the Intergovernmental Committee at its tenth session, the General Assembly adopted resolution 44/14 E, in which it resolved that the Intergovernmental Committee shall choose subjects of particular significance with major science and technology dimensions with a view to providing an assessment of technology and related policy analysis in order to facilitate the debate of the question in the General Assembly.

On the basis of the list of potential themes, the Committee may wish to propose specific themes for consideration by the Intergovernmental Committee and to recommend ways by which future themes could be chosen.

Documentation

List of potential themes for the Intergovernmental Committee on Science and Technology for Development, based on the agenda of the General Assembly at its forty-fifth session (ACSTD/XI/7)

(b) Planning and management of science and technology policy

The Intergovernmental Committee requested the Centre to submit a report to it at the eleventh session, with inputs from the Advisory Committee, on the available scientific methodologies for the planning and management of science and technology policy to promote the development of science and technology in developing countries. The Centre has received inputs from individual members of the Advisory Committee, which have been incorporated in the draft report before the Committee.

Documentation

Draft report of the Secretary-General on available methodologies for the planning and management of science and technology policy (ACSTD/XI/8)

5. Other matters

(a) Activities of the Centre on Science and Technology for Development and other organizations and bodies of the United Nations system

It has been the wish of the Committee to be kept informed of the activities of the Centre and of relevant activities of other organizations and bodies of the United Nations system. A brief presentation will be made on these activities.

Documentation

Status report on endogenous capacity-building projects carried out by the Centre for Science and Technology for Development (ACSTD/XI/9)

Report of the Secretary-General on activities of the Centre for Science and Technology for Development (ACSTD/XI/10)

(b) Future programme of work

The Advisory Committee may wish to consider its future programme of work and propose a provisional agenda for its twelfth session.

6. Adoption of the report of the Advisory Committee on its eleventh session

The report of the Advisory Committee will be submitted to the Intergovernmental Committee on Science and Technology for Development at its eleventh session.

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ADVISORY COMMITTEE ON SCIENCE AND
TECHNOLOGY FOR DEVELOPMENT
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14-18 January 1991
Item 3 (c) of the provisional agenda*

CORE PROGRAMME: REPORT OF THE PANEL OF EXPERTS ON TECHNOLOGY MISSIONS

SUMMARY

The present analysis of seven case studies reviewed by the Panel of Experts on Technical Missions clearly shows that technology missions have proved to be effective tools for harnessing and exploiting existing scientific and technological potential for the attainment of social and economic goals, while further enhancing national scientific and technological capabilities. Wherever formulated and implemented, technology missions have made it possible to complete pressing tasks more quickly and with less effort than would have been possible by other means.

An effort should therefore be made to bring to the attention of Governments, science and technology communities, international organizations and all other potential stakeholders the need further to analyse and implement this method of promoting socio-economic development through the utilization and further enhancement of science and technology. To facilitate that effort, this report presents a summary of the Panel of Experts' deliberations and conclusions, supported by the case studies which were reviewed.

* A/CN.11/AC.1/XI/1.

CONTENTS

		Paragraphs	Page
I.	DELIBERATIONS AND CONCLUSIONS	1 - 36	3
	A. Concept and definition of technology missions	7 - 9	4
	B. Formulation	10 - 13	4
	C. Definition of objectives	14	5
	D. Stakeholders	15 - 17	5
	E. Strategy and methodology considerations	18 - 23	6
	F. Organizational structure	24 - 27	6
	G. Management	28 - 29	7
	H. Monitoring and evaluation	30 - 31	7
	I. Linkages	32 - 34	8
	J. Completion and follow-up	35 - 36	8
II.	SUMMARY OF THE ANALYSIS OF CASE STUDIES	37 - 154	9
	A. India: Drinking water	37 - 49	9
	B. Brazil: Alcohol fuel programme	50 - 58	13
	C. China: Spark programme	59 - 72	14
	D. Republic of Korea: Development and dissemination of rural technologies	73 - 83	16
	E. Jamaica: Yallah pipeline project	84 - 92	18
	F. West Africa: Onchocerciasis control programme	93 - 139	19
	G. Italy: Prato system for technological innovation	140 - 154	27
III.	ORGANIZATIONAL MATTERS	155 - 160	29

Annexes

I.	LIST OF PARTICIPANTS	31
II.	LIST OF DOCUMENTS	34

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I. DELIBERATIONS AND CONCLUSIONS

1. The choice of technology missions as the topic for in-depth discussion and analysis by the Panel of Experts on technology missions was inspired by experiences in India which were brought to the attention of the Advisory Committee for Science and Technology for Development (ACSTD) when it met in that country in 1988. ACSTD considered that the technology mission concept was an approach that could provide insights into its work in other areas, such as national endogenous capacity-building, sustainable socio-economic development and international co-operation. It could also be appropriately related to such other current issues as technological blending, innovative processes in developing countries and research and development production linkages.

2. With these factors in mind, the meeting of the Panel of Experts was convened for the purpose of analysing the experiences obtained in different countries in conducting various types of technology mission and/or equivalent programmes/projects/activities. The Panel was required to take a "pro and con" approach to the technology missions selected for evaluation so that a clear separation could be made between the positive, advantageous elements on the one hand, and the negative, disadvantageous elements on the other. Finally, the Panel was expected to formulate guidelines and recommendations for the benefit of other countries which were potential technology mission users.

3. In clarifying the concept of technology missions, the Panel stressed that such missions should not be regarded as ends in themselves but rather as pathways and vehicles towards solving one or more major societal problem in a sustainable manner. Thus it was not considered so important that a particular endeavour bear a "technology mission" label. In this respect it has to be noted that, of the seven diverse case studies reviewed by the Panel, only the one from India was actually conceived as a technology mission. Furthermore, some Panel members had doubts as to whether or not their own cases could be considered as technology missions on the basis of their initial understanding of the technology mission concept. Be that as it may, after an initial exchange of views, Panel members agreed that there were important chracteristics common to all the case studies, depite their nature and dimensions. The most significant of these common factors are elaborated in the subsequent sections of this report.

4. The Panel considered it very important for all parties concerned with the technology mission approach to be made fully aware of the manner in which science and technology could be mobilized to solve pressing socio-economic problems and with the full participation of all the stakeholders. Such participation would also facilitate the erosion of undesirable environmental, social and other consequences. In addition - and this was clearly revealed in some of the case studies - it was very important for beneficiaries to be fully enlightened so as to dispel any misconceptions they might have about science and technology as an "ivory tower". Likewise, communities should be made to realize that science and technology were available for the benefit of everyone and not limited to the upper segments of society.

5. The Panel stressed that the formulation phase of a technology mission could begin only when a particular societal problem had been precisely identified and

when the basic concepts of how to overcome it had been addressed. It was equally important, during this creation phase of a technology mission, to have a solid expression of strong political commitment at the highest possible level. Furthermore, political commitment had to be sustained throughout the life of the mission, whether directly or indirectly.

6. The Panel agreed that wide dissemination of the case-study experiences and analyses was necessary, not only through this report with its annexed case studies but also through the audio-visual media, targeted on a different strata of society. The Panel could not overemphasize the great importance of the widest possible diffusion of the technology mission concept so as to promote public awareness of the roles to be played by science and technology in the acceleration of socio-economic development and in solving special developmental/societal problems.

A. Concept and definition of technology missions

7. A technology mission is an approach, methodology and activity established to solve a pressing local, national or international problem, while contributing to endogenous capacity-building. It is a concentrated and time-limited endeavour, which fully utilizes and further develops suitable technologies as essential tools to increase efficiency in attaining specified targets.

8. Its sense of urgency requires that it be conducted with missionary zeal and with the expeditious mobilization and optimization of resources, which can be facilitated through an interactive participatory management approach.

9. This concept has been formulated as a functional and flexible definition, taking into account certain diversities, depending upon the specific context considered.

B. Formulation

10. The identification of problem areas where urgent intervention is required is a national prerogative. The inherent sense of urgency lends itself to an endeavour in which highly focused efforts and concentrated resources are required for its efficient execution. In many cases, such endeavours could be achieved through the application of science and technology in the form of technology missions.

11. Governments, in collaboration with potential stakeholders, should review options for priority action and identify those areas in which technology missions would be the most appropriate means of providing the required action and inputs to ensure the speedy and successful resolution of the given problems.

12. During the phase of conceptualizing an appropriate technology mission, a broad outline of what has to be done, how it has to be done, and by whom it has to be done should be determined. The resulting decisions should be a portfolio of prioritized actions in the form of technology missions. This is necessary as a basis on which the pledging of support and the mobilization of resources can be undertaken.

13. A firm commitment should be obtained from each of the stakeholders to be directly involved in the implementation of the technology mission so that necessary administrative steps can be taken to launch that mission.

C. Definition of objectives

14. When it has been decided to embark upon a technology mission, the first priority is to translate the broad concept of what has to be done into a clearly defined objective, specifying both its qualitative and quantitative aspects. If sub-objectives are considered necessary, they should be equally well and unambiguously defined and accurately positioned in relation to the overall objective and to a detailed time-scale. Where it is feasible to do so, the sub-objectives should be formulated and arranged in such a way that the attainment of tangible, measurable goals can be readily recognized at specified evaluation points along the defined pathway to the completion of the mission.

D. Stakeholders

15. Stakeholders are individuals, groups of individuals, institutions or organizations that have some interest in the problem concerned; may be affected by it; or could have a role to play in solving it. Stakeholders could thus include:

(a) National and local authorities and agencies of Governments;

(b) Parastatal organizations and agencies;

(c) Individual scientists, engineers, technologists etc.;

(d) Industry;

(e) Non-governmental organizations and private voluntary organizations;

(f) General public;

(g) Local associations;

(h) External donor agencies, if necessary.

16. Where appropriate, special consideration might have to be given to vulnerable segments of society, such as women, children and the handicapped.

17. The nature and degree of involvement of each stakeholder in a technology mission can only be defined within a specific context. However, in all cases, the emphasis should be on the building of a consensus opinion and on participatory decision-making at every possible stage in the creation and implementation of the Mission.

E. Strategy and methodology considerations

18. The selection of a strategy or set of strategies that will most appropriately facilitate the attainment of the specified objectives is a critical decision which will have a profound influence on the outcome of a technology mission. The choice of strategy will usually be made early during the formulation phase of the mission.

19. Matching the selected strategy to specified objectives and schedule will lead to the formulation of an operational plan which may be subject to evaluation and eventually to revisions, as the mission proceeds.

20. An inspired leadership team open to innovative ideas will foster a judicious blending of traditional methodologies with newer technologies in such a way that the task to be undertaken will be fulfilled most efficiently and in an environmentally acceptable manner.

21. The capacity to exercise an accurate assessment of available technologies for their environmental soundness and for their potential as social and economic inputs etc. is an asset which wil contribute significantly to the choice of both strategy and methodology. Obviously, the choice of a particular strategy may imply the requirements for technologies which are not yet in common use or readily available in the country or which need special adaptation to specific local conditions. In other cases, local research and development may be necessary to develop the technology appropriate for the solving of a particular problem.

22. The successful use of these techniques or technologies for the technology mission will, in many cases, extend to other applications beyond the ones for which they were initially intended. Thus, the mission may generate import spin-offs and other benefits which can increase national capacity to tackle other developmental problems.

23. It may so happen that the resources necessary to fulfil a technology mission's requirements are not available or cannot be easily obtained in the country. In such cases, various options have to be explored for seeking international co-operation for technology assessment or for the procurement of the necessary technologies or for both. However, it has to be clearly understood that any international assistance which may be provided has to be structured in such a way that it helps to increase the country's endogenous capacity to meet further developmental issues.

F. Organizational structure

24. A technology mission should have a separate, autonomous organizational structure with a clear and straight-forward compartmentalization of responsibilities, functions and resource inputs. The established structure should be unconventional to the extent that it allows considerable managerial latitude and flexibility, thereby reducing the risks of bureaucratic bottle-necks which could otherwise impede the elements of urgency and expediency which are considered essential ingredients of the mission.

25. The definition and placement of financial, material and human resources and of scientific and technological inputs should be such that evaluation and audit exercises can be conducted with ease and in a manner that will enable the mission to be seen as accountable and transparent.

26. The overall authority for the planning, programming, implementation and financing of the mission should be vested in a co-ordination committee composed of representatives of the principal stakeholders. The committee will be responsible for evaluating the progress of the mission according to a defined schedule and for interdepartmental liaison and co-ordination.

27. The overall direction of the mission will be the responsibility of a suitably qualified and experienced mission manager.

G. Management

28. The less conventional structure of a technology mission requires that implemental procedures and practices be flexible and conducted according to precisely elaborated operational plans. Flexibility is needed, inter alia, to accommodate unavoidable surprises and swiftly to introduce any required changes. Operational plans, in the hands of dedicated, competent and courageous leadership, are important tools for co-ordinating a variety of different actions and events, based on decentralized decision-making processes. In addition, modern interactive management techniques and methods of communication serve both as means of securing cohesion and harmonization and as tools to minimize risks and to optimize the tapping of whatever local resources exist. Above all, operational plans as management tools should be - and should be seen to be - transparent, both internally (especially for the benefit of the participants) and externally (for other beneficiaries and stakeholders).

29. In order to ensure continued and stable (possibly, increased) public support and governmental backing, the management should use the most effective communication systems available to publicize its activities and ensure maximum visibility. Given the intricate nature of many missions, a considerable effort may have to be expended to communicate effectively both successes and failures to the general public, which, at the same time, should be assured that the missionary zeal of mission leadership and staff is matched by competence and prudence.

H. Monitoring and evaluation

30. Monitoring of operations, other activities, and the procurement/utilization of resources should be a continuing process conducted by the mission manager and his or her staff. Data collected by such monitoring should be accurate and concise, and, as far as possible, be stored in a computer to facilitate the analysis and documentation of results.

31. At predetermined steps in the implementation of the mission, the overall co-ordinative committee should conduct comprehensive technical and budgetary

evaluations. The purposes of such evaluations are to ensure that appropriate technical progress is being made in relation to the plan of operations and the overall objective, to determine the extent to which resources are being utilized cost-effectively and to recommend changes in methodology and/or strategy which may be necessary. The findings of each evaluation should be presented in an appropriate evaluation report which is given wide public distribution, so that all the stakeholders are kept regularly informed of progress and to ensure that the mission's accountability and transparency cannot be questioned.

I. Linkages

32. If appropriately orientated and with the correct external relationships, technology missions can accelerate the incorporation of science and technology into the mainstream of a country's social and economic development.

33. Implementation of a technology mission will usually require the utilization of scientific and technological support services, access to technical expertise and the adaptation or development of suitable technologies. These requirements will demand the establishment of efficient linkages between the mission's management and technical units and local science and technology institutions, as well as with industrial and services enterprises involved in the mission. Other types of linkage will also be necessary to ensure the effective dissemination of the mission's results and achievements.

34. The fostering of linkages is one of the relevant external benefits to developing countries, many of whom have difficulty in linking science and technology institutions with the productive sector. Thus, the establishment of technology mission-related linkages is another way in which those missions can contribute to endogenous capacity-building.

J. Completion and follow-up

35. Since a technology mission has to be conceived within a well-defined and optimal time-frame, it should come to an end when the planned objectives have been attained. At that point in time the mission team has to be disbanded and any follow-up responsibilities have to be transferred to an appropriate and durable institutional entity. Likewise, the management of any residual/follow-up activities should be integrated into an existing developmental infrastructure and mechanism. The latter could be, for example, a department in a local government, an institution or a non-governmental organization, with the choice being governed by such criteria as technical and administrative competence, flexibility and proximity.

36. With regard to the funding of follow-up activities, it is highly desirable that this responsibility be assumed by an appropriate in-country entity. Should this create difficulties, it might be necessary to have the national funding effort complimented by external contributions - bilateral or multilateral, which is deemed most appropriate and feasible.

II. SUMMARY OF THE ANALYSIS OF CASE STUDIES

A. India: Drinking water

1. Objective

37. Between 1985 and 1988 a total of six technology missions were launched in India, covering the specific areas of drinking water, immunization, literacy, oil seeds, telecommunications and dairy development. Of these technology missions, only the one concerned with drinking water was analysed in detail. Accordingly, it is the one chosen as a case study for the 1990 meeting of the Panel of Experts.

38. The primary objective of the mission was to significantly improve the availability and the quality of drinking water in rural areas. Sub-objectives were:

(a) To provide sources of safe water within a distance of 1.6 km to 100,000 villages by 1990 (40 litres per capita daily);

(b) To eradicate guinea worm and progressively eliminate excess fluoride, iron and salt from drinking water;

(c) To promote awareness of the relationship between water and health;

(d) To focus on water quality and set up a surveillance mechanism through a network of water-testing laboratories;

(e) To promote rain water harvesting and water conservation structures and move towards an approach where the problem of drinking water supply is seen in the context of overall water management.

2. Stakeholders

39. The stakeholders were the Government, targeted village communities and various non-governmental organizations and private voluntary organizations.

40. The key agency was the Department of Rural Development, which worked in collaboration with the following agencies: Council of Scientific and Industrial Research, Department of Science and Technology, Ministry of Civil Supplies, Department of Environment and Forestry, Department of Defence Research and Development, Ministry of Health and Family Welfare, Ministry of Water Resources, Ministry of Human Resources, Department of Agriculture, Department of Atomic Energy, Ministry of Industry, Department of Space, state governments and others. To ensure community participation and to open up activities for public scrutiny, Programme Review Committees (including members of the public) were constituted at village, district and state levels.

3. Strategy and methodology

41. The strategy consisted of the preparation of an action plan with the following priorities:

(a) Cover all problem villages by 1990;

(b) Use cost-effective technology mixes to achieve targets within the constraint of the plan allocation;

(c) Cover all villages with contaminated drinking water (chemical and bacteriological) with alternate safe sources/treatment plants;

(d) Cover all villages with per capita water supply less than 40 litres per capita daily.

42. The methodology involved the following steps:

(a) Integrate scientific efforts for locating sources in hardcore villages;

(b) Put into production water purification technologies and transfer to the field;

(c) Create a water surveillance mechanism through a network of water-testing laboratories;

(d) Promote water conservation through popularization of rain water harvesting/water harvesting methods;

(e) Promote decentralization of activities of operation and maintenance;

(f) Introduce a computerized management information system for performance monitoring;

(g) Establish standards of quality in design and materials;

(h) Effect co-ordinated action between government departments to tackle issues relating to water supply;

(i) Evolve a participative model of action through the involvement of bodies at the village level, non-governmental organizations, private voluntary organizations and women and youth organizations;

(j) Bring in communication support for social mobilization of tasks, such as technology advisory groups, steering committees and empowered committees;

(k) Evolve appropriate institutional mechanism for delivery of tasks such as technology advisory groups, steering committees and empowered committees.

4. Organizational structure

43. The national technology missions were managed as part of the Government's administrative system. Each mission had its own director, located in a central government department who reported to the Secretary. A state-level mission director, or co-ordinator, reported to the Chief Secretary. In most states, a senior officer co-ordinated all mission operations. Several states had mission advisory committees at state capital and district levels.

5. Management

44. The technology missions were co-ordinated by an adviser in the Prime Minister's office. His office provided stimulus, tackled bottle-necks and generally fostered convergence among mission operations, while communicating mission themes outwards through Government and society.

45. Technology advisory groups (TAGs) were constituted to provide scientific and technological inputs to the mission. Their functions were as follows:

(a) Group I: Water sources. To attempt precise identification of dependable water sources, to prepare plans for development of ground-water sources and disseminate ground-water sources and data to user agencies for follow-up action; to develop and suggest areas for augmentation of existing ground-water resources through microlevel ecological planning and to make recommendations for conjunctive use of ground and surface-water resources;

(b) Group II: Traditional sources. To deal with the identification and development of traditional sources as well as the development of water collection structures through use of appropriate technology and materials and to make the water from such sources potable;

(c) Group III: Quality control. To address the problems of salinity, brackishness, fluoride, iron and other chemical and bacteriological contamination through application of scientific and technological inputs and advise on location-specific and cost-effective solutions for water treatment;

(d) Group IV: Materials and design. To improve existing conventional systems through substitution of cheaper materials, corrosion resistant materials etc. and by developing economical designs that would reduce overdependence on conventional power so as to make the systems more cost-effective.

6. Monitoring and evaluation

46. A management information system was developed and is being implemented in the states. Work is in progress to have this system extended to all states. A computerized list of names of the villages where work has to be done is now available for the first time. Computerized rig monitoring has also been introduced for the first time to increase efficiency and ensure optimum utilization. To open

up activities of the mission for public scrutiny, programme review committees, including members of the public, have been constituted at village, district and state levels.

7. Linkages

47. The mission has brought together various scientific and technological institutions in the country to effect scientific source finding, which has reduced fault rates in certain areas from 40 per cent to 9 per cent.

8. Completion and follow-up

48. The number of problem villages to be covered in the seventh plan was 161,722 (as of 1 April 1985). The work of the mission started in 1986 and by the end of March 1989, the number of villages left for coverage was reduced to 20,886. Out of 140,856 problem villages covered up to March 1989, 116,289 villages were covered during the mission period.

9. Lessons learned

49. The following lessons were learned from the technical mission:

(a) In coverage of problem villages, low-cost appropriate technologies required for hill areas/sparsely populated areas have been developed;

(b) There was no uniform fast pace of implementation in all mini mission districts;

(c) Linkages envisaged in mini mission areas were not effectively operationalized;

(d) There was a lack of concrete action to move over to a community-based operation and maintenance model by state governments;

(e) The potential of the non-governmental organization sector had not been effectively utilized;

(f) Aspects of water quality were not getting adequate attention from state governments, especially in delineating areas affected by excess fluoride or salinity in water;

(g) Co-ordinated action required between Health and Water Departments at district and state levels for the fluoride control programme is not forthcoming;

(h) In some states funds were diverted for coverage of non-problem villages.

B. Brazil: alcohol fuel programme

1. Objective

50. The objective of Brazil's alcohol fuel programme "proalcool" was to develop and promote alcohol fuel for energy conservation and as an oil substitute for transportation.

2. Stakeholders

51. The introduction of the Proalcool programme in 1975 coincided with a convergence of interests on the part of key stakeholders in Brazil's transport fuel economy. The stakeholders of the programme included the Government, automakers and auto dealers, alcohol producers (including sugar-cane growers, sugar millers, ethanol distilleries and distillery manufacturers), the oil company (PETROBRAS), taxi drivers and consumers.

3. Strategy

52. To expedite the launching of Proalcool, the Government resorted to subsidies for the development of sugar-cane agribusiness and ethanol production. The subsidies were gradually reduced over time. The Government also used pricing policies as a key commercialization agent for ethanol. Sugar millers and ethanol distributors responded well to the incentives resulting from governmental policies to promote growth in ethanol output. Automakers went along with the Government's programme to improve the performance of the neat ethanol engines. In addition, taxi drivers played an important role in the dissemination of information about fuel and engine performance. Ethanol cars were provided to them at a 50 per cent discount, with all excise taxes waived.

4. Organizational structure

53. An interministerial commission was set up to be responsible for the launching of the programme.

5. Management

54. The programme was launched as a national campaign, announced as such by the Government. The performance of ethanol distributors was primarily dependant on their financial management, particularly in the light of the inflationary economy of Brazil.

6. Monitoring and evaluation

55. The monitoring mechanism was not sufficient to maintain the balanced interests of the stakeholders.

7. Linkages

56. Research and development efforts in this area were started by national institutions, with the expectation that transnational companies would follow suit.

8. Completion and follow-up

57. Since 1975, Proalcool has generally met governmental objectives, although not necessarily by its own devices. Government policy makers are introducing new policies with the express purpose of arbitrating conflicts among the main stakeholders in the Proalcool programme while addressing consumer concerns.

9. Lessons learned

58. The mission resulted in the following lessons:

(a) Not many countries could embark on an ethanol fuel programme. The optimal candidates are countries with biomass surpluses and energy deficits and which are land-locked and without their own oil resources;

(b) The lack of monitoring mechanism to detect and prevent one stakeholder from gaining too much at the expense of the other;

(c) There were spin-off benefits of the programme in terms of the tremendous technical knowledge and experience gained, biogas produced from the same alcohol that was used for fuel, and environmental roundness.

C. China: Spark programme

1. Objective

59. Formally launched in 1986, the Spark Programme is a technology development programme which aims at fostering the flourishing of the rural economy. It is based on the establishment of demonstration models which embrace appropriate technologies and the full utilization of local resources and on the dissemination of the concept in rural areas that a single spark can form a prairie fire.

60. The Programme is a long-term undertaking and an important measure for the Government to promote economic and social development in rural areas where 80 per cent of the total population is located.

61. At the beginning of the Programme, the objective was set to establish 500 Spark demonstration enterprises, to develop 100 sets of advanced equipment suitable for use in rural areas and to train 1 million people a year, during the seventh five-year plan (1985-1990). These objectives have been reached ahead of schedule - e.g., the cumulative total trainees in 1989 was 5,170,000. Specific objectives and targets for the eighth five-year plan (1991-1995) are currently being formulated.

2. Stakeholders

62. The Programme is not only supported by planning, financial, monetary, educational and industrial departments at different government levels but also receives the co-operation of social communities, such as the China Association for Science and Technology. The Communist Youth League, the All-China Women's Federation and various democratic parties assist in the mobilization of science and technology personnel, while all circles of people participate in the Programme's implementation.

3. Strategy

63. In the context of "improving the economic environment, rectifying economic order and deepening reform", the programme adheres to the principle that science and technology should serve economic development by making preferential policies to create conditions which will encourage science and technology personnel to contribute their knowledge to the development of the rural economy. Guidance and support were provided to township enterprises, the most vital economic forces in rural areas, to enable them to develop in a steady and productive way, and this has enabled them to achieve very successful results over the past four years.

64. The programme has also adopted market orientation financing mechanisms, the first in China for a science and technology programme, to mobilize all kinds of funding resources to support Spark projects.

4. Organizational structure

65. The State Science and Technology Commission has overall responsibility for the implementation of the programme, while provincial science and technology commissions are responsible for specific management areas. Within the Commission, the Spark Programme office is the executive office of the Programme, while other departments/units in the Commission (such as the Department of Industrial Science and Technology, the Rural Science and Technology Development Centre and the Biotechnology Development Centre and the National Sparks Corporation) are sponsoring related projects.

66. Spark projects are graded into three levels: State (or national), provincial and prefecture/county, and are approved by the appropriate science and technology commissions at those respective levels. Industrial ministries are also responsible for some projects.

5. Management

67. The Agriculture Bank of China, the Industrial and Commercial Bank of China and several other banks give loan quotas for Spark projects on an annual basis. Applications are reviewed and recommended (or otherwise) by expert groups.

68. Only those applications which are agreed to by the banks on the results of feasibility studies are approved as Spark projects.

6. Visibility/transparency

69. By 1989, more than 60 state-level training bases had been established, in addition to the implementation of many Spark projects and training courses. Various media have been used to disseminate information on achievements. Video films have been made by local science and technology commissions and by a Commission-co-ordinated group, and selected films are shown twice a week by the central television station.

7. Periodic monitoring

70. Since 1988, reviews of programme progress have been published in annual reports. State Spark Awards have been granted on two occasions.

8. Linkages and follow-up

71. The Spark Programme has been successfully implemented in China's rural areas because it conforms to the needs for social and economic reform and rural economic development.

72. In the future, the emphasis will be on establishing socialized science and technology service systems, on leading and spuring the development of rural pillar industrial groups and on various new forms of economic co-operative organizations in rural areas, to promote large-scale production and regional development. In addition, further efforts will be made to enlist more extensive support from society as a whole.

D. Republic of Korea: Development and dissemination of rural technologies

1. Objective

73. The objective of the programme was to develop and disseminate simple and economical post-harvest technologies for grains and fruits, in order to reduce post-harvest losses and to overcome the problems of labour shortages and high labour costs.

2. Stakeholders

74. There were four major groups of stakeholders. The Korea Institute of Science and Technology and the Korea Food Research Institute were responsible for research and development of the technologies in demand, co-ordination and dissemination, and consultation with other stakeholders. Farmers were expected to accept and utilize the developed technologies. The participating non-governmental organizations included the National Federation of Agricultural Co-operatives, the Korea Advanced Farmers Association and the Saemaul Leaders Training Institute, all worked for promotion of the developed technologies and for financial support. Finally, the

major government stakeholders was the Ministry of Agriculture, Forestry and Fisheries, responsible for administrative and financial support for the transfer of technology to farmers.

3. Strategies

75. One part of the strategy was to develop locally suitable rural technologies, utilizing the inherently favourable climatic conditions for the drying and storage of paddy rice (dry and cool air in autumn; 75 per cent relative humidity, 15° C) and the storage of fruits (moist and cold air; 79-90 per cent relative humidity, 0° C) and domestic construction materials, in order to make it easier for the farmers to use the new technologies.

76. The other part of the strategy was to ensure maximum dissemination of the new technologies to farmers through the various promotional efforts of interested governmental and non-governmental organizations.

4. Organizational structure

77. Research and development work on the required technologies was conducted by each project team under the general direction of the Programme Director of the research and development institutions. The Programme Director was also deeply involved in the dissemination process, as well as being responsible for co-ordination among the concerned bodies.

5. Management

78. From the beginning of the programme, full technical and administrative responsibility for its implementation was given to the Programme Director.

6. Visibility, transparency and public support and involvement

79. Research and development outcomes and achievements were widely popularized and well accepted by farmers. Consequently, the number of farmers who use the new technologies has been increasing over the past 10 years and will continue to do so in the years to come.

7. Periodic monitoring

80. The Research Institute has been responsible for assessing techno-economic feasibilities with regard to the technical aspects of the programme, and the acceptability of new technologies has been frequently monitored on behalf of the farmers.

8. Linkages

81. The Research Institute has been responsible for maintaining linkages not only with the stakeholders but also with the academic sector and, through the mass media, with the general public.

9. Completion and follow-up

82. Although the programme came to completion in 1988, after nine years of operation, diversification and dissemination of the technologies has carried on and will be continued for some time to come.

10. Lessons learned

83. This programme is a good example of how scientists can successfully apply their research and development efforts in a developing country to help solve problems faced by rural farmers. In light of this experience, the technology mission approach should be utilized for the betterment of rural communities elsewhere.

E. Jamaica: Yallah pipeline project

1. Objective

84. The objective of this project was the construction of a 19-mile (30-kilometre) water pipeline from the Yallah River, near the town of Middleton Abbey, to a new treatment plant in Hope, near Kingston, over a three-year period. The purpose of the pipeline was to supply 20 million gallons (90.9 million litres) of water per day to the recipient populace.

2. Stakeholders

85. The principal stakeholders were the Government's Ministry of Public Utilities and Transport, the National Water Commission, Carib Engineering Company, the Jamaica Defence Force and Tak Weld.

3. Strategy

86. Using a "fast track" approach, the pipeline was designed as it was constructed.

4. Organizational structure

87. In 1983, the Government established the Carib Engineering Corporation as the implementing agency.

5. Visibility/transparency

88. Project progress was made known to the public through documentary films, TV/radio interviews and articles in the press - some initiated by the stakeholders, others by the media agencies.

6. Periodic monitoring

89. Fortnightly project review meetings, involving all the stakeholders, were held to address problems and issues and to take problem-solving decisions.

7. Linkages

90. Linkages were between the various stakeholders, all of whom were responsible for certain segments of the pipeline construction.

8. Completion and follow-up

91. The project was completed on time in the allocated three-year period. Carib Engineering Corporation is now responsible for the implementation of all water-related projects in Jamaica.

9. Lessons learned

92. It was evident from the pipeline project that this type of technology mission can serve as a launching pad for introducing the integration of science and technology into the process of national development. It also serves to build the endogenous capacity of the country while, at the same time, solving a pressing socio-economic problem. It became clear that flexibility in the decision-making process and effective communication between the stakeholders were necessary.

F. West Africa: Onchocerciasis control programme

1. Objective

93. The objective of the Onchocerciasis (River Blindness) Control Programme in West Africa is to eliminate onchocerciasis as a disease of public health and socio-economic importance and to ensure that there is no recrudescence of the disease thereafter, within the boundaries of the Programme area. In the programme area, 2.4 million people are infected and close to 100,000 have become blind. (Globally, WHO estimates that 85.5 million people are exposed to the risk of the disease, 17.5 million are infected and 340,000 have become blind.)

2. Stakeholders

94. The stakeholders consist of participating countries (also donors), the sponsoring agencies and the international donor community.

95. The participating and beneficiary African countries since 1974 have been Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Niger and Togo. In 1986 were added Guinea, Guinea-Bissau, Senegal and Sierra Leone.

96. The sponsoring agencies are the Food and Agriculture Organization of the United Nations, the United Nations Development Programme (also a donor), the World Bank (also a donor), and the World Health Organization (a donor and the executing agency).

97. The international donor community is represented by the African Development Bank, Belgium, Canada, the Commission of European Communities, Germany, Calouste Gulbenkian Foundation, Finland, France, Italy, Japan, Kuwait, Luxembourg, Netherlands, Norway, OPEC Fund for International Development, Portugal, Republic of Korea, Saudi Arabia, Switzerland, United Kingdom and the United States of America.

3. Strategy

98. Onchoceriasis is caused by a parasitic, filarial worm, Onchocerca volvulus. The adult female lodges in nodules under the skin or deeper in the tissues and produces millions of microscopic embryos (microfilariae) during its lifespan, which averages 9-11 years but rarely exceeds 14 years. The microfilariae, which live about two years, give rise to intensely itching rashes; wrinkling, thickening and depigmentation of the skin; lymphadenitis, resulting in hanging groins and elephantiasis of the genitals; loss of weight and general debilitation; and eventually, to severe eye lesions, including blindness. The life expectancy of the blind is reduced by 10-15 years.

99. In West Africa the vectors of the disease are blackflies of the Simulium damnosum species complex. The female lays its eggs at, or below, water surface in fast-flowing rivers where they hatch after 36-48 hours. The larval stage lasts from 5 to 10 days (depending on the water temperature) and is followed by pupation. Adult blackflies emerge after a further two to four days and live up to four weeks, during which time they can cover up to several hundred kilometres in flight.

100. When a female blackfly takes a bloodmeal (necessary for the maturation of its eggs) from a person with an onchocercal infection, it ingests microfilariae, which are transformed within the blackfly to infective larvae and then transmitted to other persons during subsequent bloodmeals. The larvae develop in the human host into adult male and female worms (macrofilaria), and the life cycle of the parasite is completed.

101. Since 1987, ivermectin, a microfilaricide drug, has become available for large-scale distribution in human populations and has proved to be a valuable therapeutic agent for morbidity control, easily dispensed under field conditions but without the originally hoped-for, decisive impact on transmission.

102. Since no drugs are available for the control of the disease through large-scale delivery, larviciding of the breeding sites of the blackfly larvae is at present, the only means of interrupting transmission of O. volvulus.

103. Because of the inaccessibility of many of the blackfly breeding sites and the large size of the Programme area (now over 1.3 million km^2), aircraft are used to apply insecticides to the rivers. Light planes are used for larger rivers, while helicopters are used for narrow twisting waterways and those partly overhung by forest.

104. Fourteen years of vector control operations are required to ensure that the reservoir of the disease in man dies out. Thus, in these countries where vector control commenced during 1986-1990, operations will come to an end over the period 2000-2004.

4. Organizational structure

105. The overall authority for the planning, programming, implementation and financing of the operations is invested in a Joint Programme Committee composed of representatives of the participating countries, of the donors and of the sponsoring agencies. The Committee normally meets once a year to consider the annual progress report, to approve next year's plan of action and budget, and to deal with other important Programme matters.

106. An Expert Advisory Committee, with a membership of not more than 12 scientists, carries out annual independent evaluations of operations and gives technical and scientific advice to the Programme Committee and the Programme Director. The five-member Ecological Group, a sub-committee of the Advisory Committee, monitors the effect of vector control on the aquatic environment.

107. Representatives of UNDP, WHO, FAO and the World Bank meet several times a year as the Committee of Sponsoring Agencies, to consider management issues and review documentation for the Joint Programme Committee. The Committee of Sponsoring Agencies can provisionally authorize supplementary budgets and approve budget transfer between budget lines. The Committee also supports socio-economic development of the Oncho-controlled zones.

108. National Onchocerciasis Committees in the participating countries promote the activities sponsored by the Programme, such as devolution. Representatives meet as required, usually once a year.

109. The Programme is financed by donor countries, international development banks, multilateral institutions and United Nations agencies, as well as by the participating countries which also make staff available to it, provide office space and offer operational facilities. All contributions are deposited in the Onchocerciasis Fund which is administered by the World Bank and audited by its external auditors. The annual plan of action and budget is approved by the Joint Programme Committee followed by pledging of donor contributions.

110. A system of financial phases has facilitated medium-term planning and budget forecasting. Each six-year phase is covered by an Onchocerciasis Fund Agreement, signed by the contributing parties, which constitutes the legal basis for the funding and operations of the Programme. A memorandum of agreement, describing the institutional and operational arrangements of the Programme and signed by WHO and each of the participating countries, forms part of the Agreement. In addition, individual protocols are established by the Programme with each Government of the participating countries.

5. Management

111. The Programme is managed according to WHO procedures and is technically and administratively assisted by that organization. The overall direction, including general policy and programme management, is entrusted to the Director's Office, which also handles external relations, co-ordination of research and socio-economic assessment, support to devolution, information to the public, training, meetings and the Geneva Liaison Office.

112. The Director is supported at Programme headquarters in Ouagadougou, Burkina Faso, by five technical and administrative units (vector control, epidemiological evaluation, biostatistical analysis and information systems support, socio-economic development assessment, and administration and support services), each headed by a chief assisted by operational/scientific and General Services staff.

113. To obtain the best possible cost/efficiency ratio of Programme operations, a close watch is kept on all activities at all levels to ensure the greatest benefit at the lowest cost. Annual staff seminars serve as occasions to imbue operational and administrative staff with a high degree of cost-consciousness. More specifically, good management practice has allowed for a reduction of staff by 30 per cent between 1987 and 1990, to some extent compensated for by the use of nationally employed personnel. Also, through negotiations with industry the Programme direction has succeeded in lowering the price of some larvicides.

114. In the field of institution-building, the Control Programme has created a highly efficient regional administration and communications network in support of all Programme activities, based on a complement of well-trained, competent and motivated staff, by far the majority recruited from the participating countries, and supported by a region-wide radio system and computer link-up.

115. Annual programme proposals contained in a plan of action and budget translate medium-term programmes into detailed activities and corresponding budgets. The consideration of the WHO progress reports and the plans of action and budget by the Programme Committee affords an excellent opportunity to assess achievements and to determine the future direction of the Programme.

6. Monitoring, evaluation and assessed achievements

Vector control

116. Aerial spraying operations are carried out by a fleet of up to 11 helicopters and two fixed-wing aircraft, available on commercial contract. Weekly flight plans and dosage schedules for larvicides are worked out on the basis of entomological and hydrological data collected by the Programme-wide entomological surveillance network and communicated to the operational bases and Programme headquarters by means of the radio system. The surveillance network consists of sectors and subsectors manned by entomologists, laboratory technicians, vector collectors, radio operators and drivers. Hydrological conditions (water level and discharge rates) are monitored by automatic devices in rivers and teletransmitted via satellite to the operational centres.

117. The Programme has had the benefit of the advice of the Ecological Group and the support of a Programe-wide network of aquatic monitoring stations in its efforts to ensure that the effect of larviciding on the non-target fauna remains insignificant. At present, the Programme's hydrobiological service monitors aquatic invertebrates, while national teams survey fish populations.

118. As early as 1978, the annual transmission potential (the theoretical number of onchocercal larvae received by a person stationed at an insect capture point during one year) had dropped from 800 to below the acceptable level of 100 in two thirds of the area under larviciding. Rapidly, a similar situation extended to the entire original area, except the reinvaded zones in the west and in the south-east and in a few circumscribed zones where vector control had met with operational difficulties.

119. Thus, in 1985 the last year of larviciding in the whole of the original area, more than 90 per cent of the insect capture points reported annual transmission potential of 0 or less than 100. Since then, larviciding has practically ceased in that original area with the exception of the reinvaded zones and the areas where operational problems temporarily impeded effective control.

120. The situation in the reinvaded zones in the original programme area has greatly improved since larviciding extended to sources of reinvasion beyond the boundaries of the seven-country original area.

121. In spite of extensive larviciding there has been little effect on the aquatic environment. No disappearance of species has been recorded, and the observed modifications have been of minor importance, and in any case reversible.

Epidemiological evaluations

122. Until 1988, the activities of the Epidemiological Evaluation Unit were essentially oriented to an assessment of the impact of vector control by means of repeated examination of indicator villages consisting of "simple evaluations" (search for microfilariae in skin-snips and visual testing) and "detailed evaluations" (ophthalmological examinations added). Much of this work has, since 1989, been carried out by Programme-trained national teams, supervised by the Evaluation Unit and supported materially and financially by the Programme.

123. The data obtained from the evaluations in indicator villages allow for the computation of the incidence, prevalence and community load of infection. These indices, which constitute the elements for trend analysis, have taken on added importance in the original programme area, where they are used to determine where and when onchocerciasis has reached the level below which larviciding can cease.

124. The Programme also carries out dissection of onchocercal nodules in order to ascertain the proportion of dead female worms in communities under vector control.

125. The Evaluation Unit, with substantial help from national epidemiological teams, has since 1988 completed a comprehensive programme of epidemiological mapping in the extension areas with a view to establishing baselines for future assessment of control operations, estimating the number of people infected and blinded by onchocerciasis, and identifying communities in need of large-scale ivermectin treatment. In addition to skin-snip examination, the Unit has undertaken special ophthalmological surveys to determine the seriousness of the infections transmitted, and to eventually evaluate the effect of ivermectin treatment.

126. Finally, the Unit conducts community-wide ivermectin distribution programmes in villages with populations at risk of onchocercal blindness, again largely aided by national teams and with the active support of non-governmental organizations. Other approaches to ivermectin distribution in affected villages are under study by the Programme, together with national health authorities.

127. As a result of the interruption of transmission during up to 14 years of vector control, the community microfilarial load has come close to 0 in all of the original programme areas, excepting the reinvaded zones and in a few circumscribed areas.

128. Once the CMFL approaches the zero level in a given area, it can no longer be used for trend analysis and is replaced by other indicators. The prevalence in the major part of the original Programme area is now insignificant, and larviciding has been discontinued in more than 80 per cent of that area.

129. Another success of vector control, confirmed by epidemiological evaluation, is the fact that no onchocercal infections occurred in the original area among children born since the start of vector control, except in the reinvaded zones and in the few areas where transmission temporarily relapsed.

130. It is estimated that by 1991 approximately 7 million children born after Programme operations started will have been spared the risk of contracting onchocercal blindness, that 30 million people (including the population of the extension areas) are protected from onchocercal disease, that 1.25 million initially seriously infected are no longer so, and that over 100,000 have been prevented from going blind.

Biostatistics

131. The unit concerned with biostatistical and information systems supports other units in the analysis of operational data and in the planning and evaluation of field studies; provides technical backstopping for the computerized information system; and trains Programme staff in its use. The computer network covers headquarters and all operational stations. The Unit has developed a transmission model for predicting the epidemiological effect of larviciding in the original area. This model is capable of producing epidemiological forecasts under varying control scenarios, including the risk of recrudescence of infection and disease after cessation of vector control.

Assessment of socio-economic development

132. Programme activities in this field are limited to the collection of data required for assessing the impact of Programme operations on socio-economic development. The unit concerned also liaises with the participating countries and facilitates studies undertaken by the Committee of Sponsoring Agencies.

133. As a first step, the Committee of Sponsoring Agencies sponsored a regional study to identify, within areas under Programme control, the zones with promising development potential, and to prepare follow-up action. The second step was a study of resettlement designed to provide guidelines for promoting settlement-related development in onchocerciasis-controlled zones. The third activity consisted of an in-depth analysis at the national level to serve as the basis for the formulation of development plans for each country's onchocerciasis area.

134. So far, 15 million hectares of riverrain, tillable land have been made available for resettlement and cultivation, in part as a result of Programme operations. This allows for growing foodstuffs enough to feed 17 million people. It is expected that the land available for resettlement will come close to 25 million hectares before the end of this century.

Research

135. The Control Programme research programme is entirely operations-oriented and follows closely the recommendations made by the Expert Advocacy Committee. Recently, the research priorities fall into five major groups: vector control (Simulium bionomics and larvicides), identification of parasite strains, immuno-diagnostic testing, chemotherapy (search for a macrofilaricide, effect of ivermectin on transmission - alone or in combination), modelling and health systems research (epidemiological surveillance and recrudescence control).

Training

136. Between 1974 and October 1989, over 300 Programme fellows have been trained in such disciplines as entomology, hydrology, hydrobiology, epidemiology, parasitology, ophthalmology and public health - practically all in African institutions.

7. Linkages

137. The Programme has established strong linkages with various national authorities in the participating countries (in the fields of medicine, hydrology, environmental monitoring and socio-economic development), with universities and other specialized institutions (mainly for research), with industry (for the development of insecticides and drugs) and with non-governmental organizations and private voluntary organizations.

8. Completion and follow-up

138. The Programme is progressing on schedule, to meet its target for coming to an end in 2003-2004. Thereafter, some form of intercountry facility will co-ordinate national activities in the fields of onchocerciasis surveillance and drug distribution.

9. Lessons learned

139. The factors which have been recognized as having contributed significantly to the success of the Programme and which can serve as lessons to be learned for the planning and execution of technology missions are:

(a) The Programme's objective, strategy and method of operation were all clearly defined. These enabled the Programme to get off to a quick start. Furthermore, having a clear objective helped to focus inputs and inspire staff, while also generating confidence among the stakeholders;

(b) Programme goals were set within a realistic time-frame;

(c) Flexibility, both in administration and in scientific and technical operations, contributed significantly to efficiency of operations and to overall success;

(d) With regard to monitoring, entomological evaluations were conducted weekly and on a continuous basis. They informed Programme staff of whether or not the control method was working correctly and thus enabled adjustments to be made without delay. These evaluations also provided the first indication of whether the strategy was correct. Over a longer time-scale, epidemiological evaluations provided confirmation that the strategy and methodology were correct for obtaining the defined objective. Regular meetings of Programme staff "in house" and with the Expert Advisory Committee and the Ecological Group provided opportunities for checks to be made on progress;

(e) The Programme's highly focused character contributed to its accountability. Because all the stakeholders understood exactly what the Programme was supposed to accomplish, and how, there was very little ambiguity in determining whether or not the required progress was being made. Thus it was easy for all the stakeholders to hold the Programme accountable for its results;

(f) This ease of accountability made it possible for the Programme to be accorded considerable autonomy. The Programme has had extrabudgetary status and been granted a great deal of latitude in its management and operations. This had made the decision-making process relatively responsive and unbureaucratic;

(g) The Programme has used a special management style in which employees are granted considerable responsibility and flexibility. This has helped to make the Programme flexible, responsive and efficient;

(h) From the outset all the stakeholders understood that the Programme had to be a long-term undertaking. Recognizing this, the donors committed themselves to 20 years of support. This long-term commitment was beneficial in several ways. It allowed time for trial-and-error approaches to operations; it provided good job prospects to employees; and it stimulated staff to be forward-looking, which has enabled them to anticipate problems and take remedial action well in advance;

(i) Programme staff have actively maintained communications with all the stakeholders, which receive regular reports on operations and budgets. This communication has served two purposes. It has established dialogue among the Programme and other stakeholders so that Programme staff can discover problems or complaints and address them quickly. Secondly, it has given all the stakeholders a sense that they have a real stake in the Programme;

(j) The Programme has been accurate in forecasting expenses and has taken unusual care in preparing budgets. It has also followed a financial management policy which has made staff extraordinarily cost-conscious and has led to a high degree of accountability;

(k) Programme staff have always kept abreast of new scientific and technological advances and have been prepared to introduce new and appropriate technologies whenever possible, with a view to increasing the cost-efficiency of operations. This has even applied to "high tech" innovations, where they were considered to be the most cost-effective.

G. Italy: Prato system for technological innovation

1. Objectives

140. One of the main duties of the Italian Committee for Research and Development on Nuclear and Alternative Energies is the transfer of technologies to small and medium-sized industries operating in traditional sectors and to homogeneous industrial districts.

141. The Prato textile area is one of the most important small industry and business networks in Italy. The main features of the Prato industrial district are: 15,000 local textile manufacturing units; 66,000 employees; textile industry turnover: $US 4.5 billion; textile industry exports: $US 2.2 billion; production: carded wool, 70 per cent of Italy's total, top wool, 15 per cent of Italy's total.

142. Like other industrial districts, made up of many very small firms, the Prato sector has some weak points, needing a correct strategy of intervention, in order to:

(a) Encourage the co-operation among different operators, such as industrialists, craftsworkers' organizations, trade unions, regional agencies, financial operators;

(b) Face training problems: managers must become aware of the opportunities offered by new technologies; technicians need greater familiarity with advanced tools;

(c) Solve information needs by creating large common data bases, available to each small firm;

(d) Link small firms with reliable technological partners.

2. Strategy and methodology

143. The intervention of the Committee, acting as technological operator, has to be integrated in the local social and economic environment, by developing consortia with firms, industrial associations, banks, chambers of trade, local authorities and trade unions.

144. The strategy is focused on the provision of real services, facing real technological needs, and not financial support. Highly specialized and sophisticated needs are to have priority.

145. The intervention is composed of three main phases. In the definition phase, the presence of technology-supplying companies is investigated; the intervention is structured by the creation of a responsible "authority" which performs the analysis of weak points and needs; and a technical evaluation is performed through the study of the production cycle, the feasibility and cost/benefit analysis and the choice of priorities. Co-operation with supplying companies is promoted.

146. In the implementation phase, the following tasks related to each project are undertaken: definition of requirements and specification, design, prototype implementation and field test, technical information diffusion and promotion in the area.

147. In the evaluation phase, an analysis of the achieved results (technical and economic outcome, impact on the market etc.) is made, and feedback on the single project and on the global intervention is studied.

3. Management and stakeholders

148. The intervention is performed by the creation of an authority, the Sprint Association, which is composed of the Italian Committee for Research and Development on Nuclear and Alternative Energies, the telephone company, the Union of Prato Industrialists, the Confederation of Artisans (Prato section), the National Confederation of Artisans and Craftsmen (Prato section), the Chamber of Commerce of Florence, the Savings and Deposit Bank of Prato, Monte dei Paschi di Siena, Instituto Bancario S. Paolo di Torino, the Bank of Tuscany, the Savings Bank of Pistoia and Pescia, and the Textile Worker's Trade Union (Prato section). Financial and organizational support is given by the Italian Committee, the region of Tuscany, the Chamber of Commerce of Florence, the Savings and Deposit Bank of Prato, the municipality of Prato and the European Community Commissions.

4. Projects

149. There are three lines of projects implemented by Sprint.

Telematic project

150. Based on a local network, the telematic project was conceived to provide administrative services (accounts, wages, banking), technical information, trade and market data, etc. After a study and design period of four years, the network

has been running since December 1987 in an experimental way. It serves a sample of 300 industrialists and craftsmen and offers several services - for example: a data base on the demand and availability of semifinished products (PRATEL); information on the reliability and financial solvency of the Prato world clientele (UNINFORM); a home banking service (VIDEOBANK); financial data, legal advice; and electronic mail.

Projects on technologies

151. The line on technologies for production and processes improvement has led to the development of a series of innovations, combining local needs with the supply of existent technologies. Several interventions are being tried - for example, running textile CAD (computer-aided design) workstation, automatic reel-loading systems, study of new methodologies for dyeing and quality control, experimental electronic control systems of circular looms, study for robotization of some spinning phases and automatic colour management, store automation.

Energy and environment line

152. In this line several projects are scheduled, both in energy saving and environmental defence - for example, energy-saving in washing and finishing processes, heat recovery from waste waters, treatment of waste waters.

5. Foreseeable evolution and future activity

153. Important evolutions in Sprint are foreseen, both in the range of new technologies and in the improvement of the transfer methodology. An increase of the range of technologies can be expected, including more sophisticated information technologies, advanced chemical processes, fine manipulation and robotics, and lasers implementation.

154. Upgraded evaluation criteria and follow-up tools will include cost/benefit analysis on line, global intervention monitoring and feedback, and extension to other industrial districts transfer process.

III. ORGANIZATIONAL MATTERS

155. The Panel of Experts on Technology Missions, convened by the Advisory Committee on Science and Technology for Development (ASCTD), met in Serock, Warsaw, from 11 to 14 September 1990, under the co-chairmanship of Professor Stefan Kwiatkowski and Dr. Carlos Abeledo. The meeting was jointly organized by the United Nations Centre for Science and Technology for Development and the Polish State Office for Scientific and Technological Development.

156. Lists of participants and of working documents are presented in annexes I and II. The agenda adopted conforms with the contents of this report.

157. In opening the meeting, the Chairman of the Advisory Committee on Science and Technology for Development welcomed the participants and explained the purposes of the meeting. He referred to the origin of the technology mission concept and how it related to endogenous capacity-building. In his view, endogenous capacity-building was not for the sake of developing capacity per se but rather for its application to socio-economic development. Technology missions could thus be considered vehicles for achieving concerted developmental goals.

158. The Executive Director of the United Nations Centre for Scence and Technology for Development referred to the Vienna Programme of Action on Science and Technology for Development, in which the right concept, that of endogenous capacity-building had been advocated. However, for many different reasons the world at large had ignored the call for the implementation of that Programme. In his view, technology missions could be seen as one element in the process of endogenous capacity-building, or the interim product of that process. Technology missions were the national components of the portfolio of prioritized initiatives which resulted from the stakeholders' dialogue process promoted by the Centre at the national level. Thus, technology missions and endogenous capacity-building had a very intricate relationship, with both emphasizing that demands be the driving force in the development process.

159. The co-Chairman of the meeting described the evolution of the work on technology missions in the context of the Advisory Committee on Science and Technology for Development. He explained the relevance the topic had to other issues considered by the Committee, such as endogenous capacity-building, linkages, sustainable development and technological blending. He hoped that the Panel discussions would go deep into the analysis of both positive and negative experiences of the participants in executing missions and that the resulting report would be an awareness report for countries which had yet to try out the innovative technology mission approach.

160. During the course of the meeting, a representative of the UNIDO International Promotion Service presented the experience of UNIDO in promoting technology missions in industrial sectors of developing countries.

Annex I

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Annex II

LIST OF DOCUMENTS

TM/1	Provisional agenda
TM/2	Issues paper
TM/3	Excerpts of ACSTD report from Vienna session in 1989: Working Group on Technology Missions
TM/4	Excerpts of ACSTD report from Zhuhai session in 1990: Working Group on Technology Missions
TM/5	A case study on technology missions: development and dissemination of rural technologies in the Republic of Korea
TM/6	The Yallah Pipeline Project: the story of a technology mission in Jamaica
TM/7	Spark Programme in China
TM/8	Building ENPPI: the story of the challenges of building a national engineering company for the process industries (Egypt)
TM/9	Onchocerciasis Control Programme in West Africa
TM/10	Alcohol as an alternative fuel (Brazil)
TM/11	Technology transfer to developing countries: the Italian example
TM/12	Non-fossil transportation fossil fuel: the Brazilian sugarcane ethanol experience
TM/13	Promotion of technology missions - the role of UNIDO

Information materials

TM/Inf.1	List of participants
TM/Inf.2	Proposed programme of work
TM/Inf.3	List of documents
TM/Inf.4	Integrated research programme on technologies for rural development: a German/Korean co-operation project
TM/Inf.5	The socio-economic impacts of the dissemination of new rural development technologies in the Republic of Korea

TM/Inf.6	The will to change (India)
TM/Inf.7	National drinking water mission: action plan 1989-1990 (India)
TM/Inf.8	National immunization mission: action plan 1989-1990 (India)
TM/Inf.9	National technology mission on oilseeds: action plan 1989-1990 (India)
TM/Inf.10	National literacy mission: action plan 1989-1990 (India)
TM/Inf.11	National telecommunications mission: action plan 1989-1990 (India)